

Integrating Technology into Charter School Classrooms



Setting the Course for the 21st Century

Center for Research in Educational Policy
The University of Memphis

Steven M. Ross
Deborah L. Lowther

The Expectations ~

■ Why are computers in our schools?

■ Job Readiness

- The majority of people (76%) who took a recent Public Opinion Poll indicated that computers should be used to prepare students for future jobs.

■ How are computers used in the workforce?

**Word Processing
Databases
Information**

**Presentation
Spreadsheets
Communication**



The Expectations ~

- **What do the national curriculum standards say about technology use in our schools?**



The Expectations ~

■ Mathematics

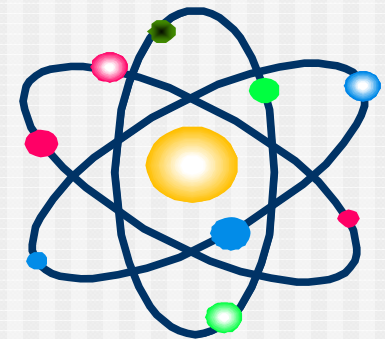
- K-2 Create simple computer graphs
- 3-5 Use computers to organize/represent data
- 6-8 Create and select appropriate graphs
- 9-12 Construct detailed graphs
 - histograms, dot-plots, or stem-and-leaf plots



The Expectations ~

- **Science**

- **K-4 develop skills to use computers for conducting investigations**
- **5-12 use computers for the collection, summary, and display of evidence**



The Expectations ~

■ English

■ Students use technology to:

- gather and synthesize information
- create and communicate knowledge.



The Expectations ~

■ ISTE NETS

■ Students use technology to demonstrate:

- Creativity and Innovation
- Communication and Collaboration
- Research and Information Fluency
- Critical Thinking, Problem-Solving & Decision-Making
- Digital Citizenship
- Technology Operations and Concepts

Fact or Fiction?

- Research shows that increased technology integration in K-12 schools *raises student achievement*.

ANSWER = FICTION

- Technology doesn't "affect" achievement. Improved teaching and learning does.

The Research-Based Computer Lab



We had to put the computers away because we couldn't find credible evidence they were improving test scores.

Fact or Fiction?

- Research shows that increased technology integration in K-12 schools *improves student technology skills.*

ANSWER = FACT

- Assuming students work on meaningful tasks.

Fact or Fiction?

- Research shows that increased technology integration in K-12 schools is *supported by the majority of teachers*.

ANSWER = It all depends on:

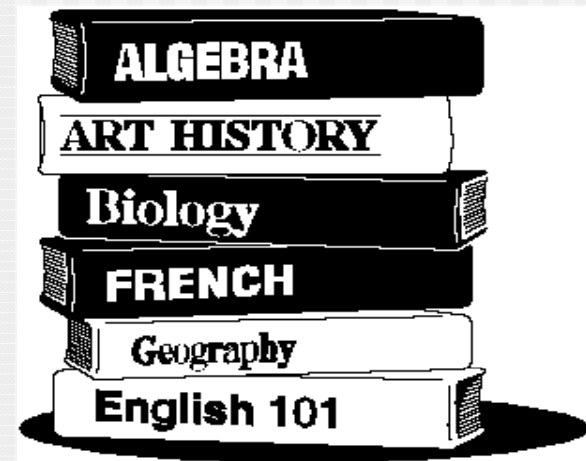
- School climate
- Professional development
- In-school support

BONUS QUESTION

If technology is highly accessible, what ***factors*** will be most critical to realizing improvements in achievement test scores?

FACTORS

How closely technology use is integrated with the curriculum (state standards, etc.).



Fact or Fiction?

■ BONUS QUESTION

FACTORS

- The degree to which teaching methods accommodate meaningful technology usage.

Direct
Instruction



VS.

Student-Centered
Instruction



Fact or Fiction?

■ BONUS QUESTION

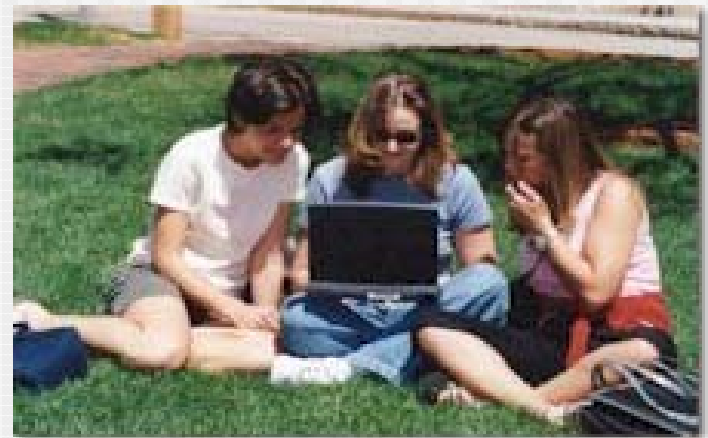
FACTORS

- The degree to which technology usage increases.

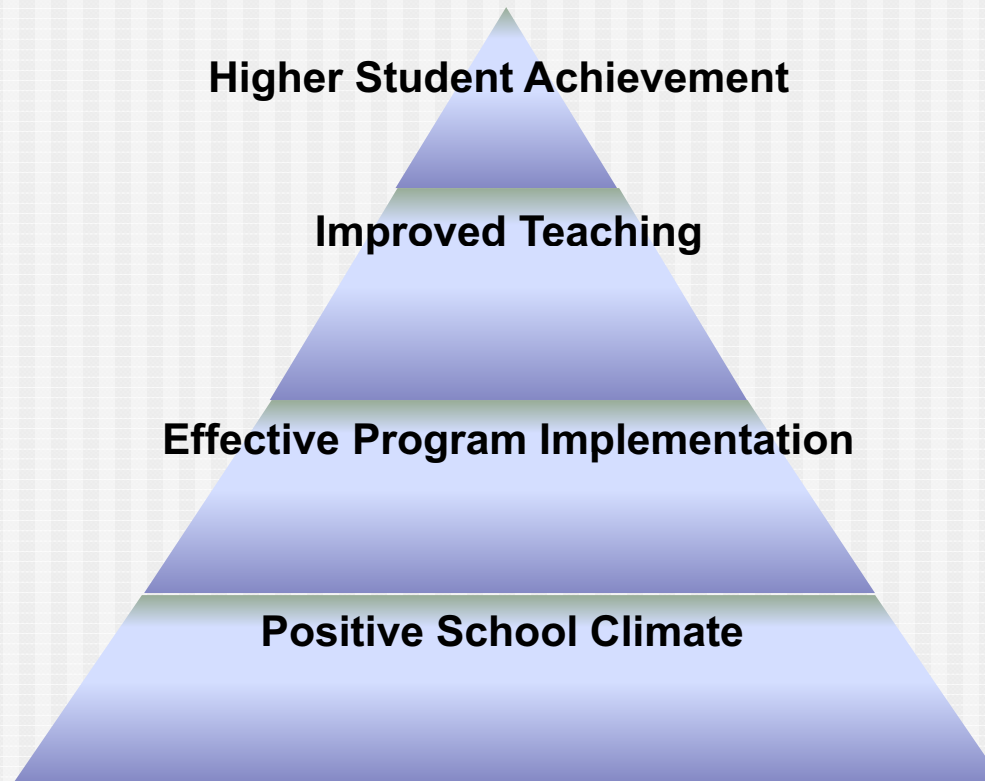
Academically-focused class time



Student interest and engagement in learning

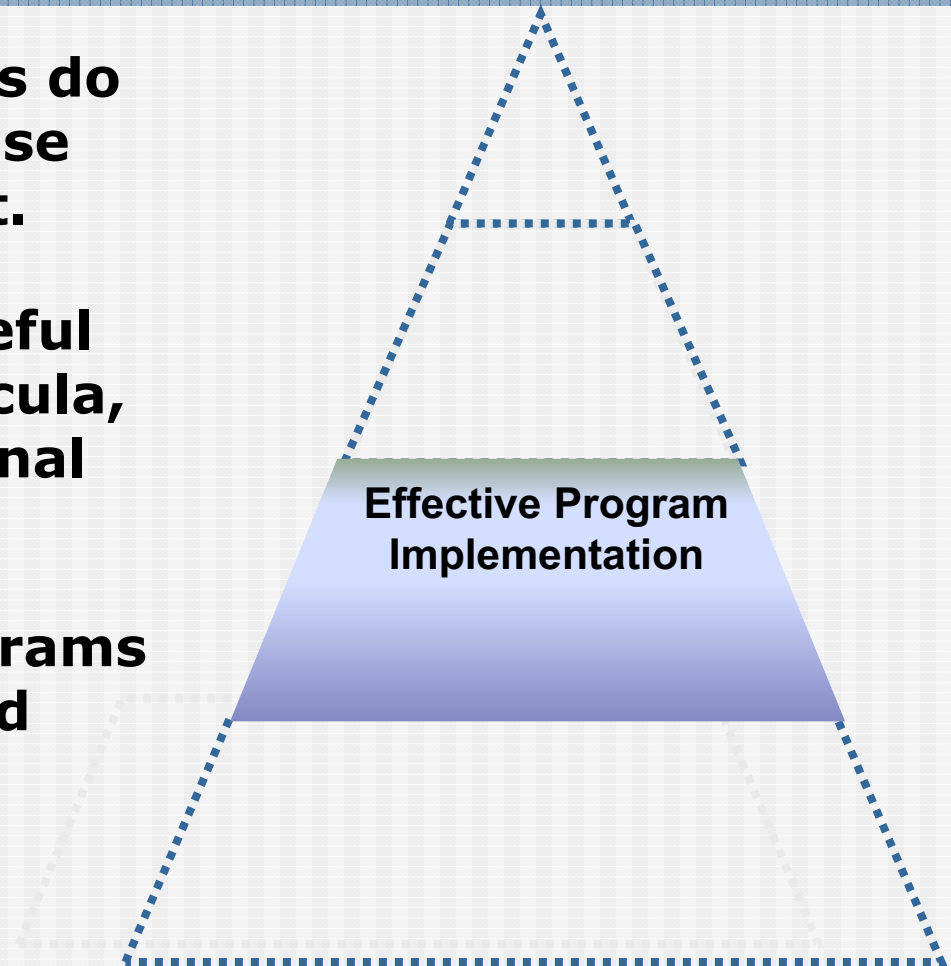


Effective School Hierarchy



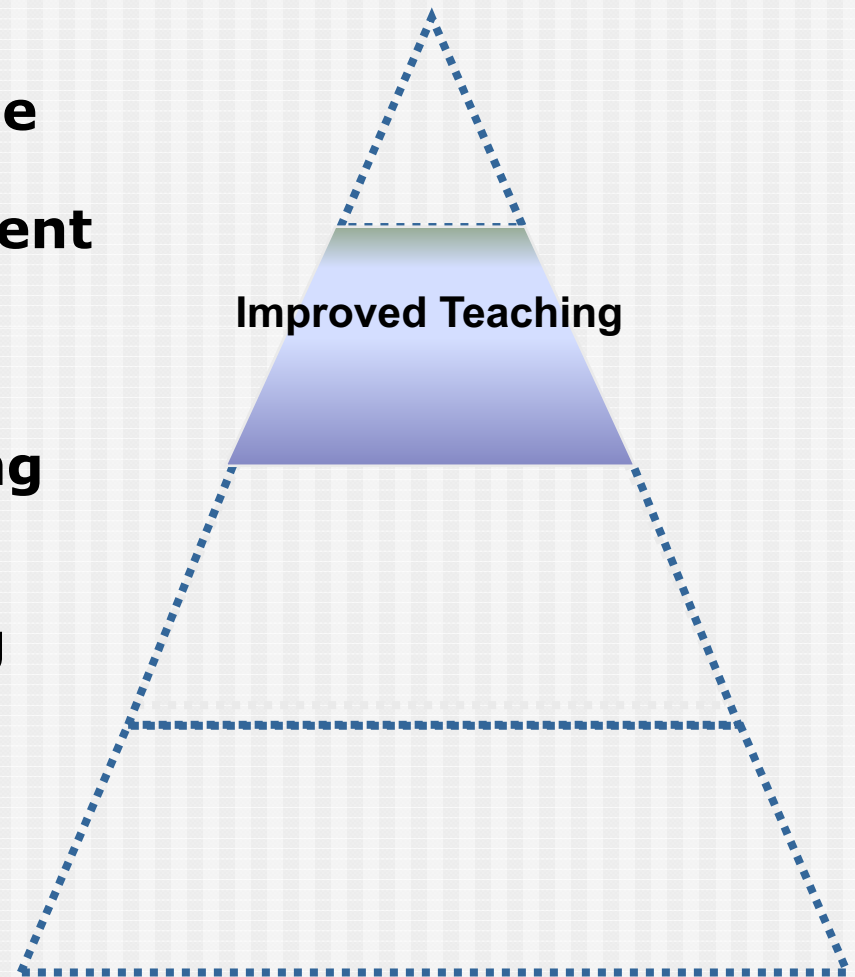
Assumptions about “Technology Programs”

- **Technology programs do not automatically raise student achievement.**
- **They can provide useful tools, enriched curricula, & targeted professional development.**
- **To be effective, programs must be implemented properly.**



Teaching Improvement

- **Higher academically-focused instructional time**
- **Higher student engagement**
- **Technology use as a tool**
- **Student-centered learning (projects, inquiry)**
- **Higher order questioning**
- **Higher order feedback**

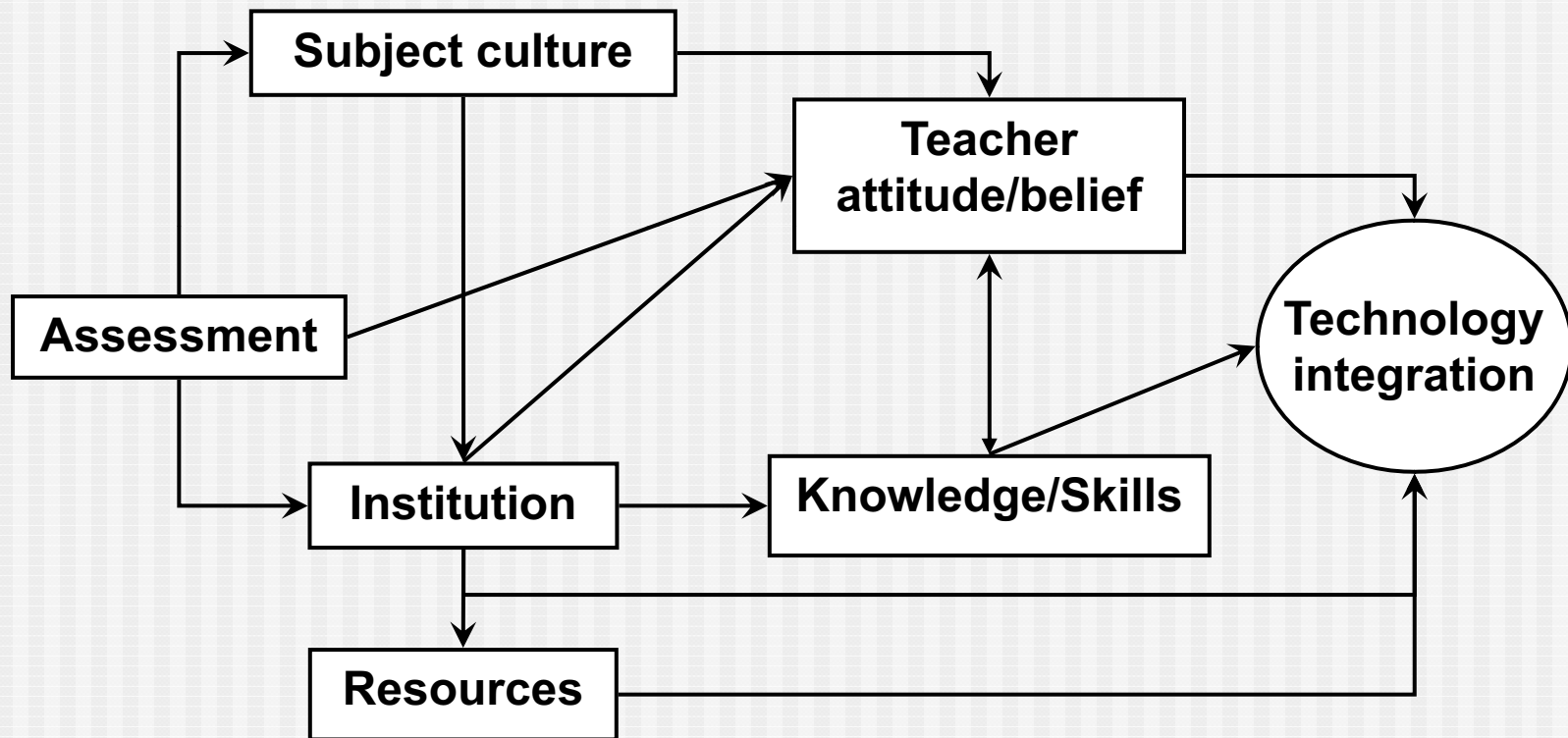


Raising Student Achievement through A Technology Program

Conclusions

- **Achievement is unlikely to improve simply by doing more “drill & kill” (20th Century teaching) on isolated skills.**
- **Critical factors are improved curricula, instructional strategies, and conditions for learning.**
- **Charter schools are expected to be leaders of innovation.**

Sustaining Technology Integration



Hew & Brush (2006)

Sustaining Technology Integration

Hew & Brush (2006)



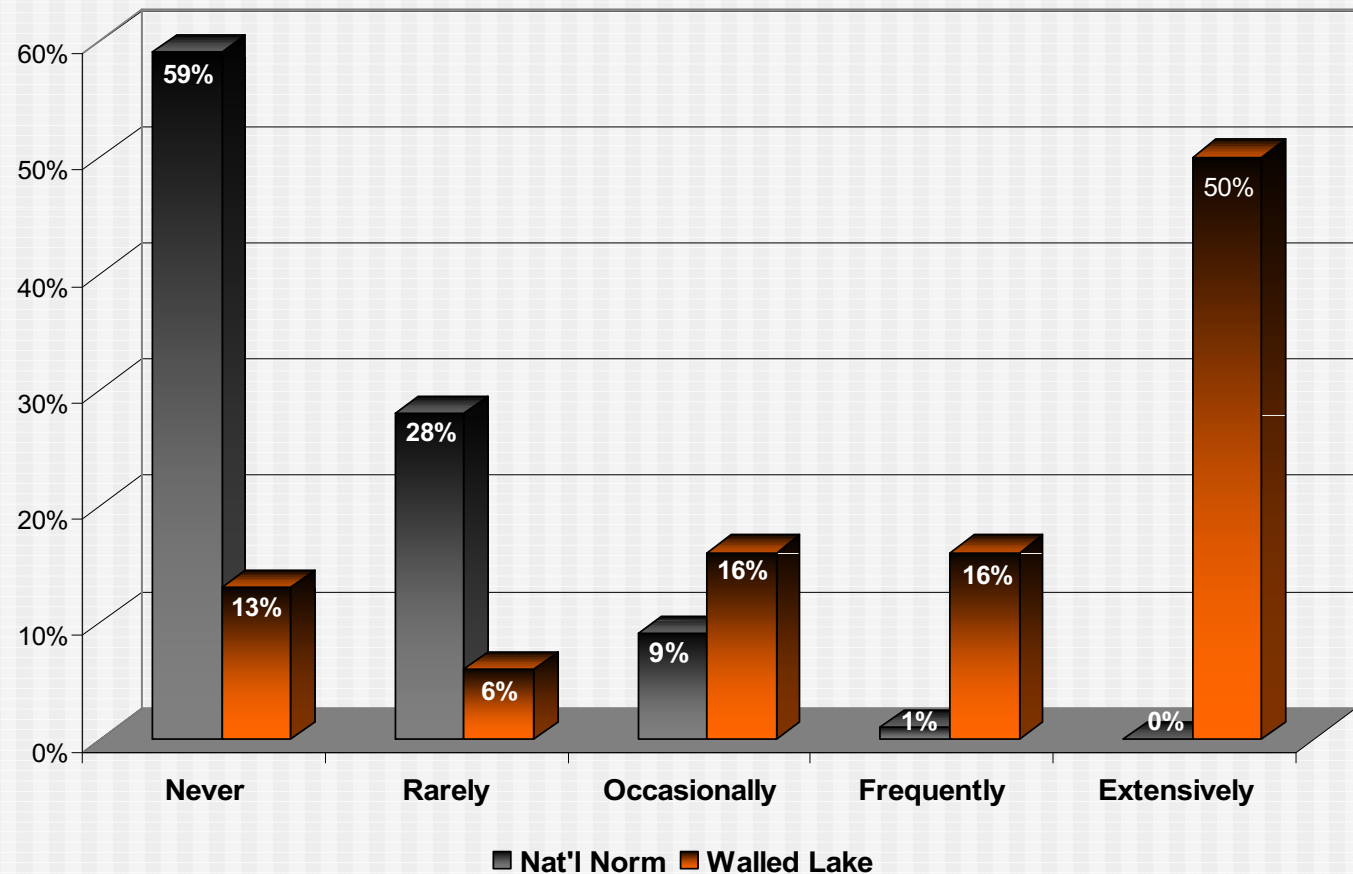
**Technology
integration**

What is Technology Integration?

- **The teacher is technologically skilled and assumes roles of designer, manager, and facilitator.**
- **The student is actively engaged in the learning process, becoming technologically competent.**
- **The computer is used as a tool, as in the workplace, to enhance learning via real-world applications.**
- **The lesson is student-centered, problem-based, authentic, and integrally involving technology**

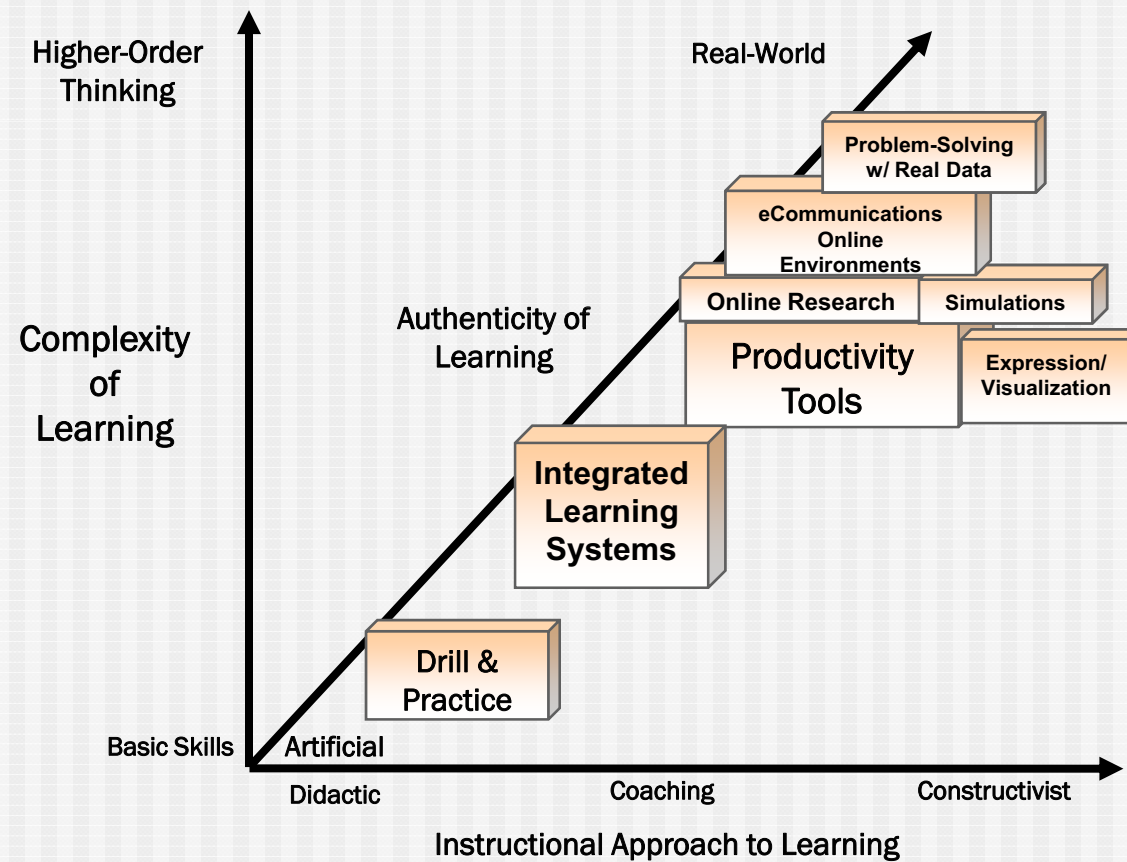
The Reality ~

Student Use of Technology as a Tool

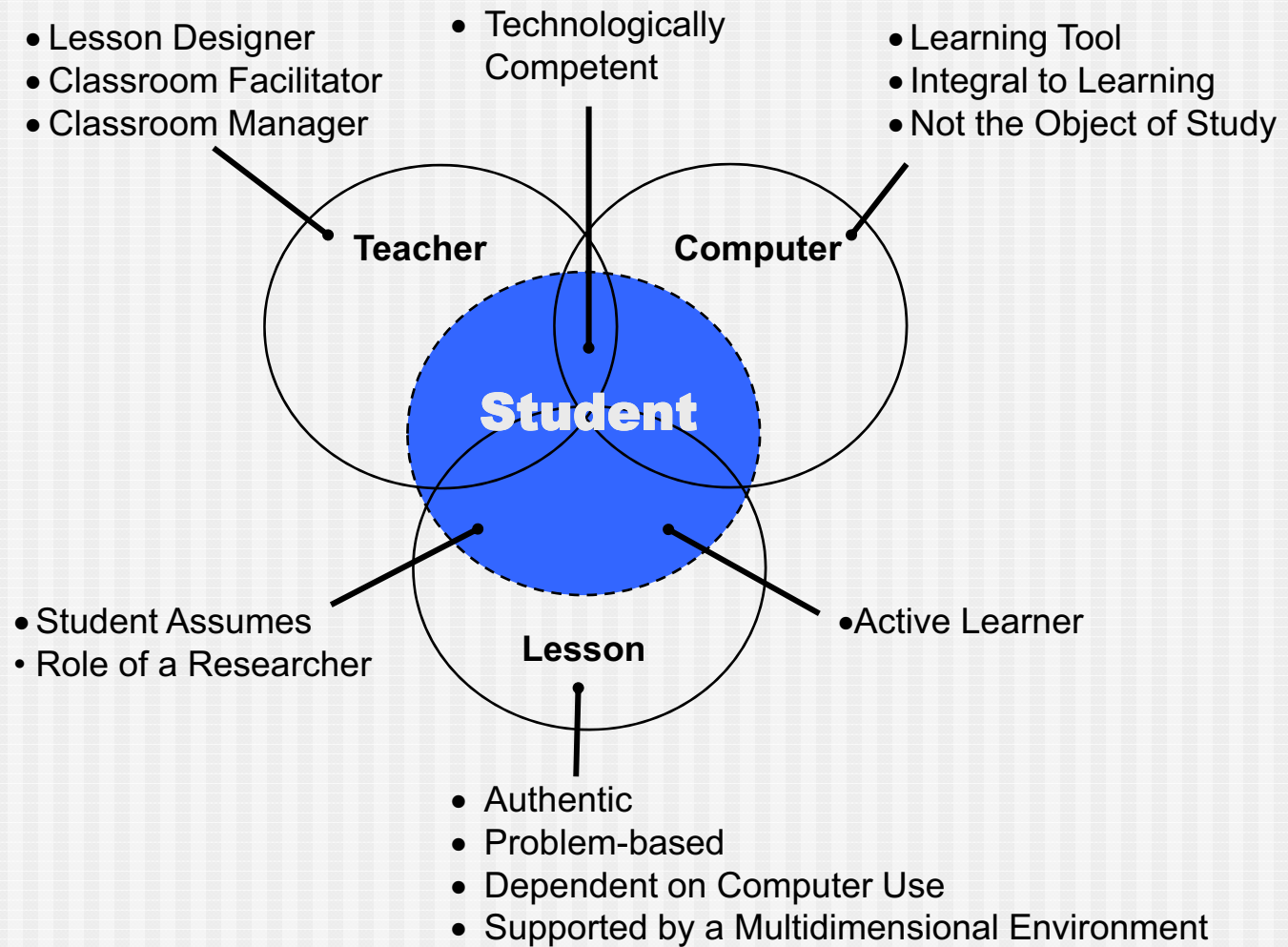


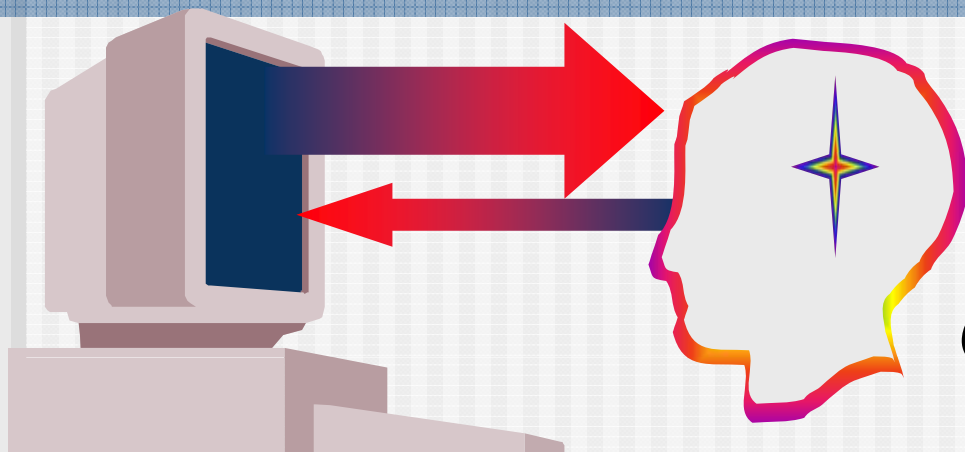
enGauge Model

Range of Use

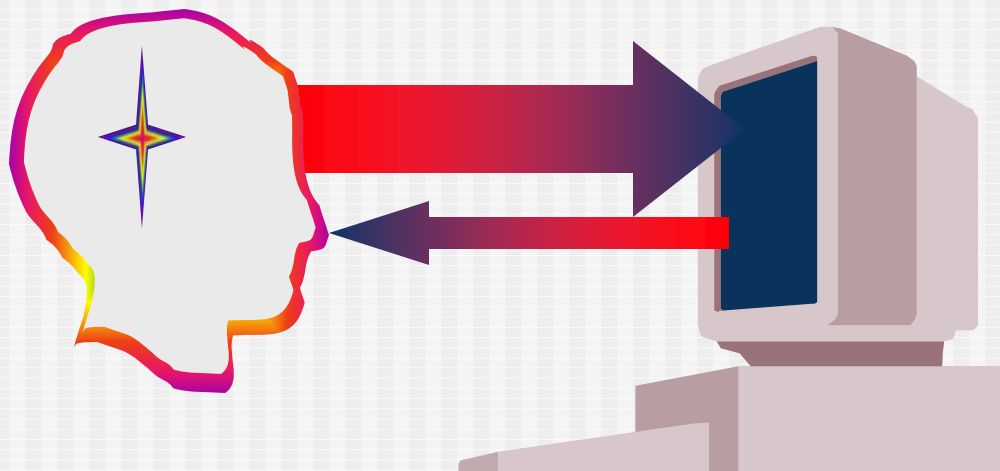


The NTeQ Model



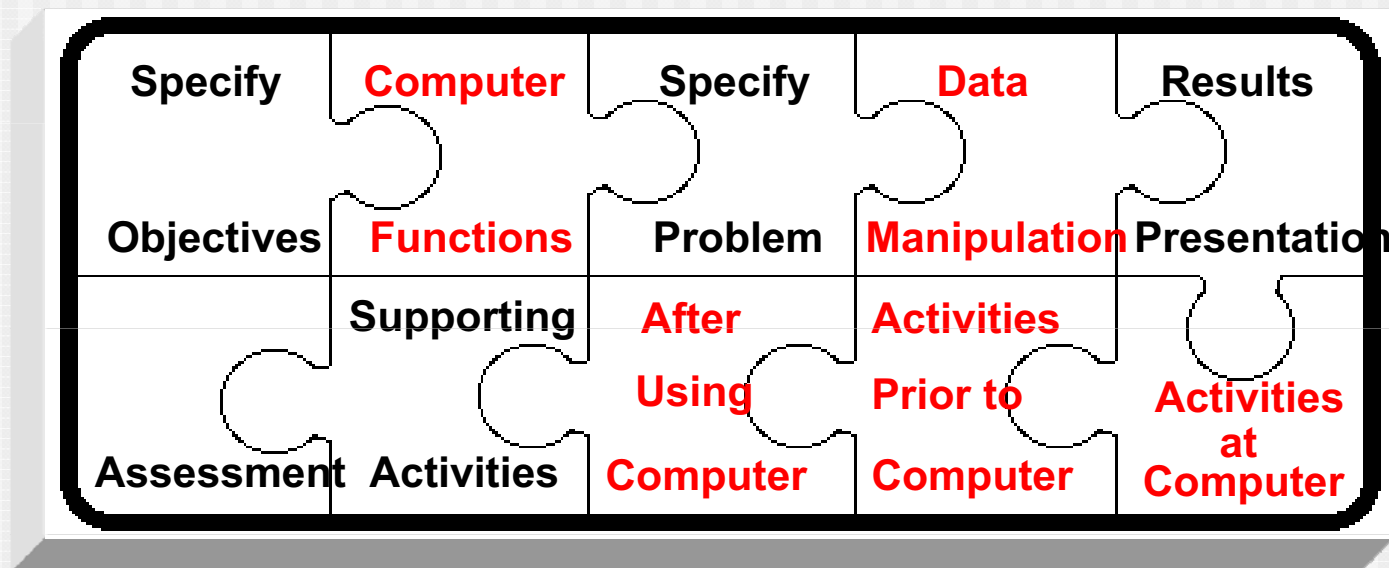


*Current
Approach*



*NTeQ
Approach*

The NTeQ Lesson



Sustaining Technology Integration

Hew & Brush (2006)

Assessment

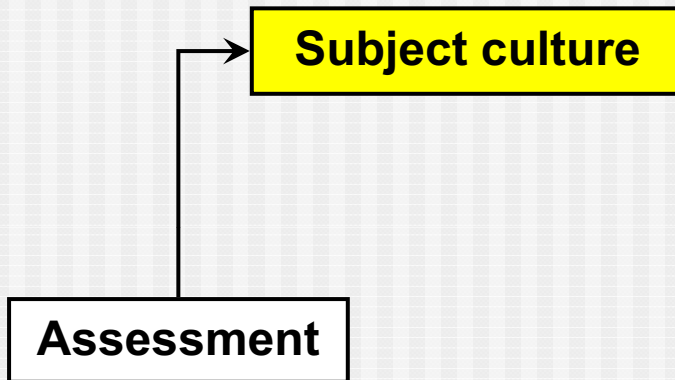
**Technology
integration**

Assessment

- **How student learning is measured**
- **Authentic vs. traditional**
- **High stakes testing**

Sustaining Technology Integration

Hew & Brush (2006)

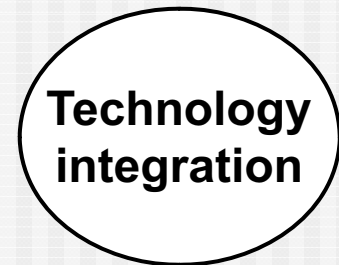
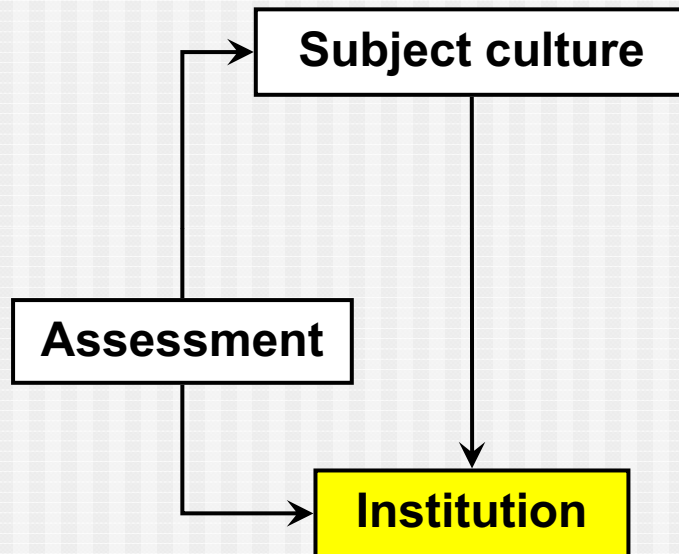


Subject Culture

- **Typical School Practices for teaching given subjects**
 - **Art**
 - **Science**
 - **Math, etc.**

Sustaining Technology Integration

Hew & Brush (2006)

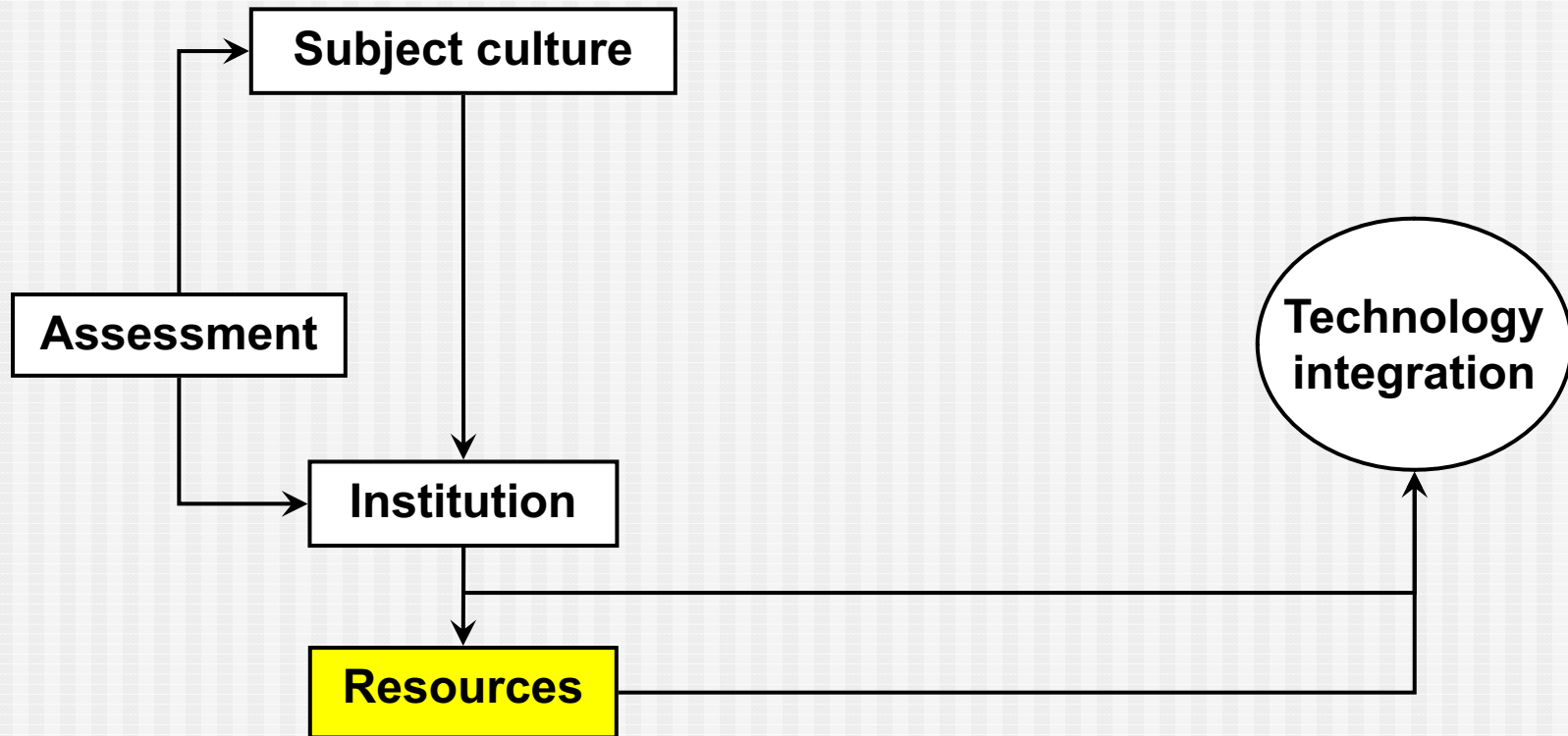


Institution

- **Leadership**
- **School Schedules**
- **Time/Encouragement for Planning**
- **School Climate**

Sustaining Technology Integration

Hew & Brush (2006)

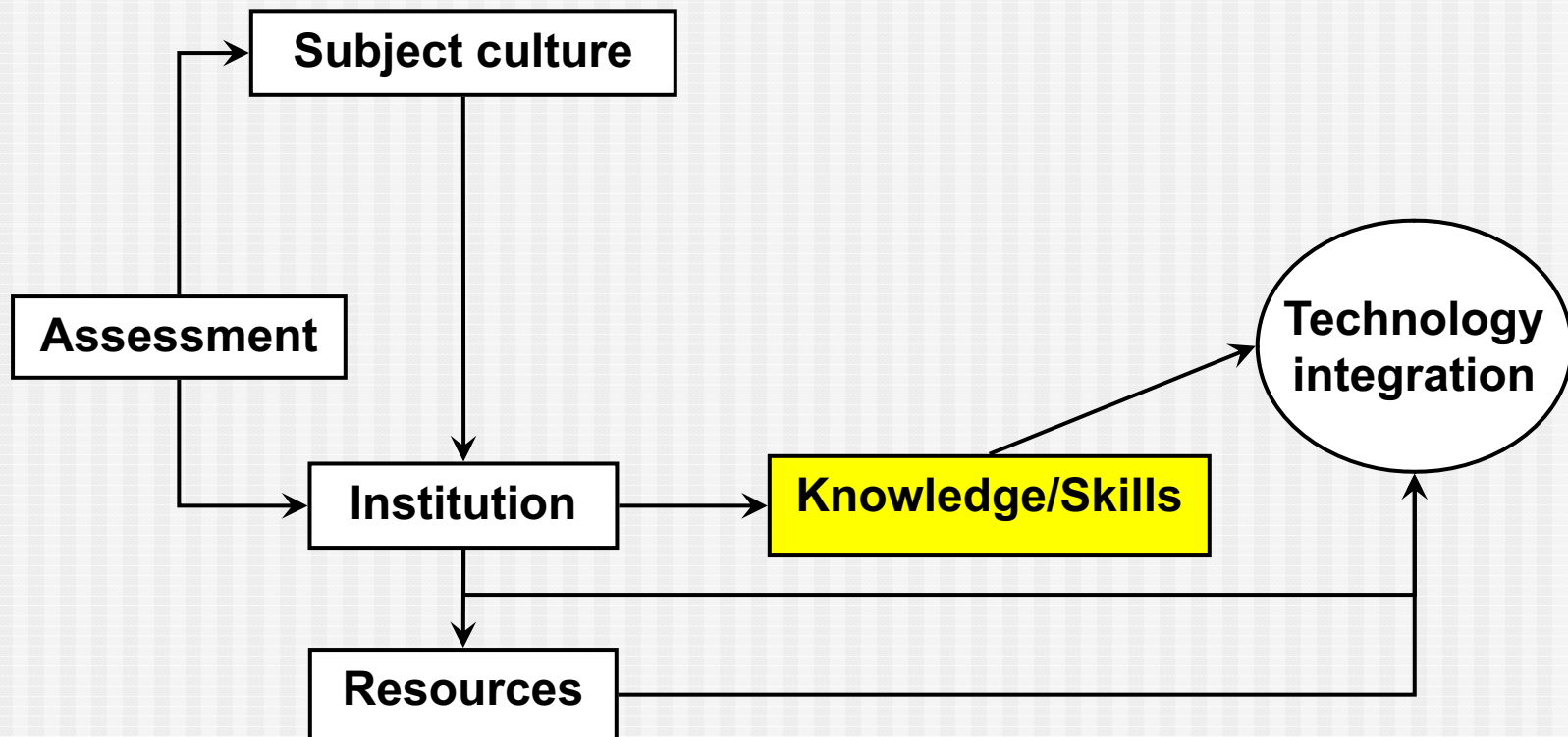


Resources

- **Technology (computers, equipment)**
- **Access to technology**
- **Time (review websites, prepare lessons)**
- **Technical support**

Sustaining Technology Integration

Hew & Brush (2006)

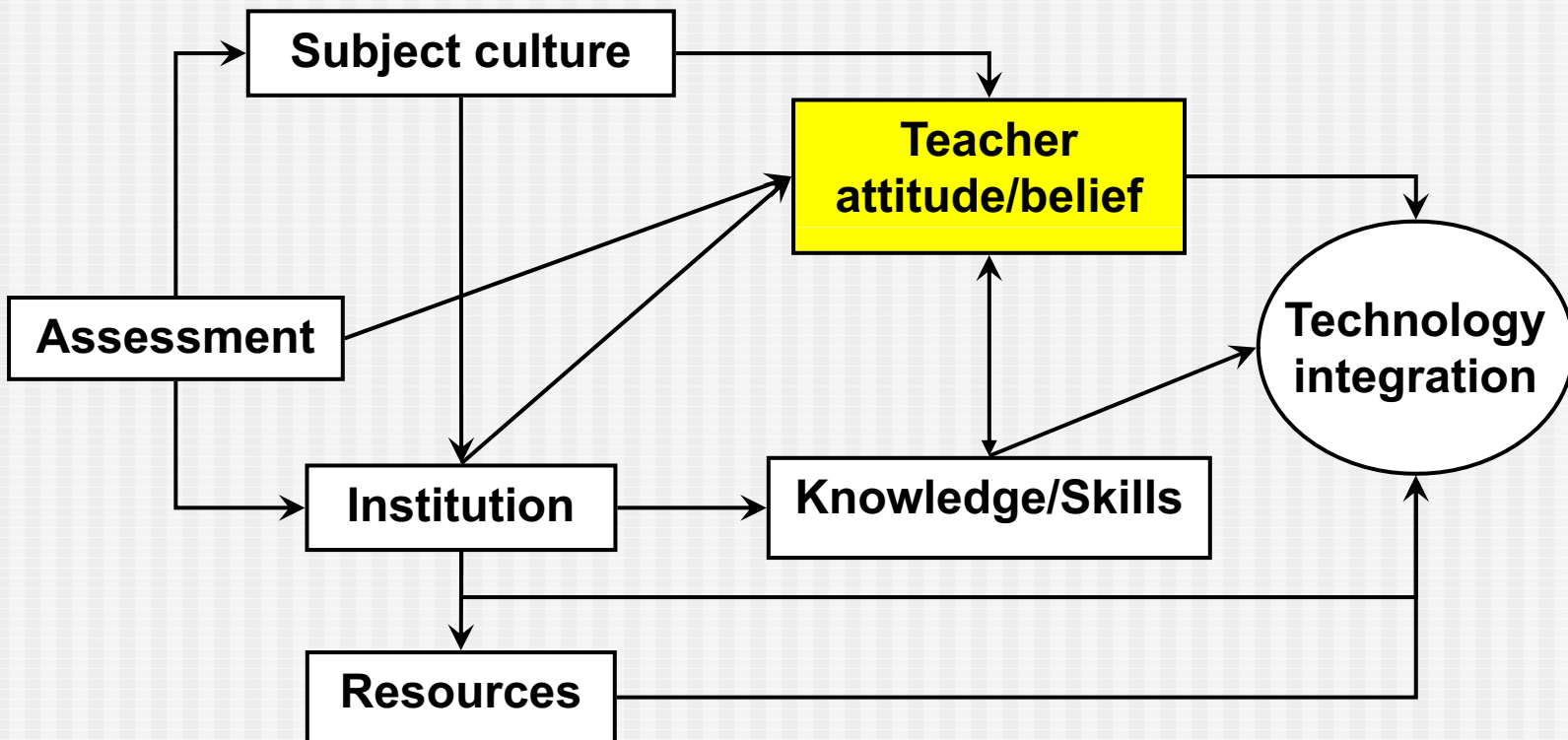


Knowledge/Skills

- **Teachers' technology expertise**
- **Technology-supported pedagogy**
- **Technology-related classroom management**

Sustaining Technology Integration

Hew & Brush (2006)



Teacher Attitudes/Beliefs

- **Liking/Disliking Technology**
- **Pedagogical Beliefs**
- **“Can technology be helpful to my teaching?”**

Exemplary Programs

**When interests and conditions for
technology integration come
together.**

District 24/7 Laptop Program

- **Primary Research Questions**
 - **Is teaching different in Laptop as compared to Control Classrooms?**
 - **Do students achieve differently in Laptop classrooms?**

Context and Data Sources

■ Context

- Walled Lake Consolidated Schools
- 40 - 5th, 6th, & 7th grade classrooms in 7 schools

■ Data Sources

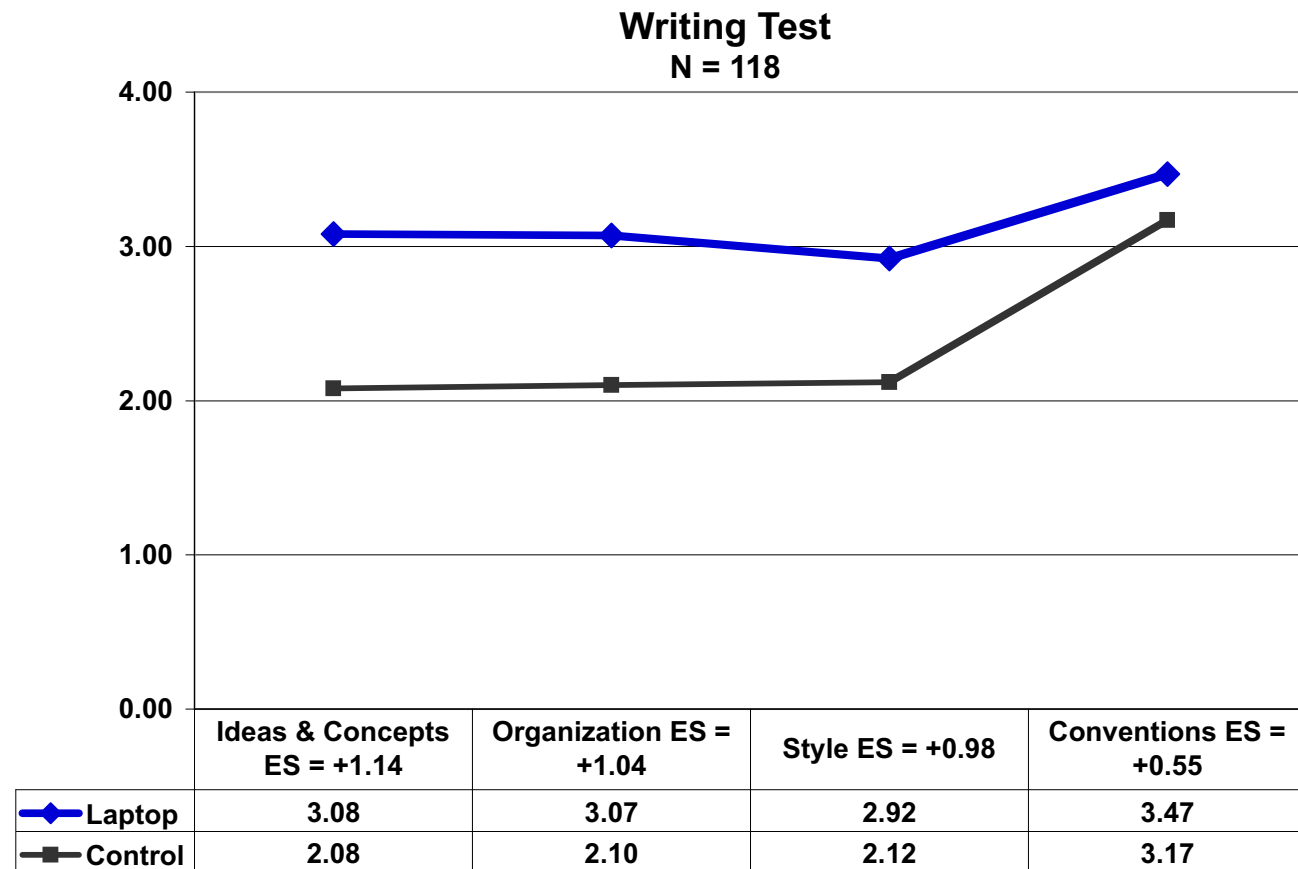
- Observations: 55 1-hr observations
- Achievement: 118 students
 - 58 Laptop
 - 60 Control
 - District Writing Test

Findings

- **Is teaching different in a laptop classroom?**
 - **Laptop as compared to Control students:**
 - **Used computers more frequently, extensively, and independently**
 - **More frequently had a high-level of attention, interest, and engagement**

Findings

Do students achieve differently in a laptop classroom?



Scale: 4 = highest rating

Freedom To Learn (FTL) 1:1

Primary Research Questions

- **Is teaching different in Laptop as compared to Control Classrooms?**
- **Does FTL enhance student achievement in core academic subjects?**

Context and Data Sources

■ Context

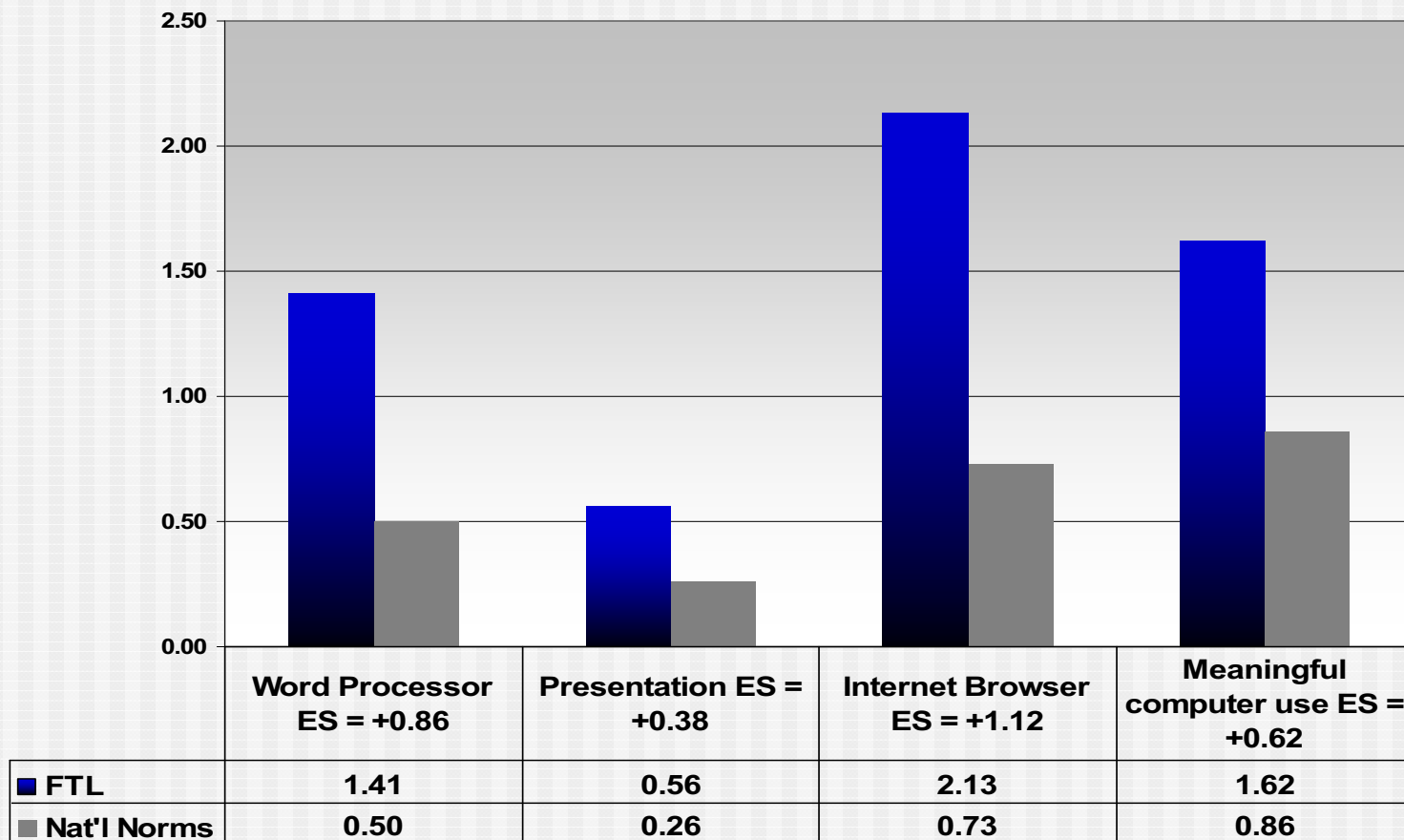
- 199 FTL K-12 Schools

■ Data Sources

- Observations:
 - 535 hours of direct classroom observation
 - 1,087 FTL classrooms
- Achievement: Michigan Educational Assessment of Progress (MEAP)
 - 16 middle schools (8 FTL, 8 Matched-Control)
 - All 7th grade students
 - English, Math, Reading, Writing

Whole Grade SCU Results

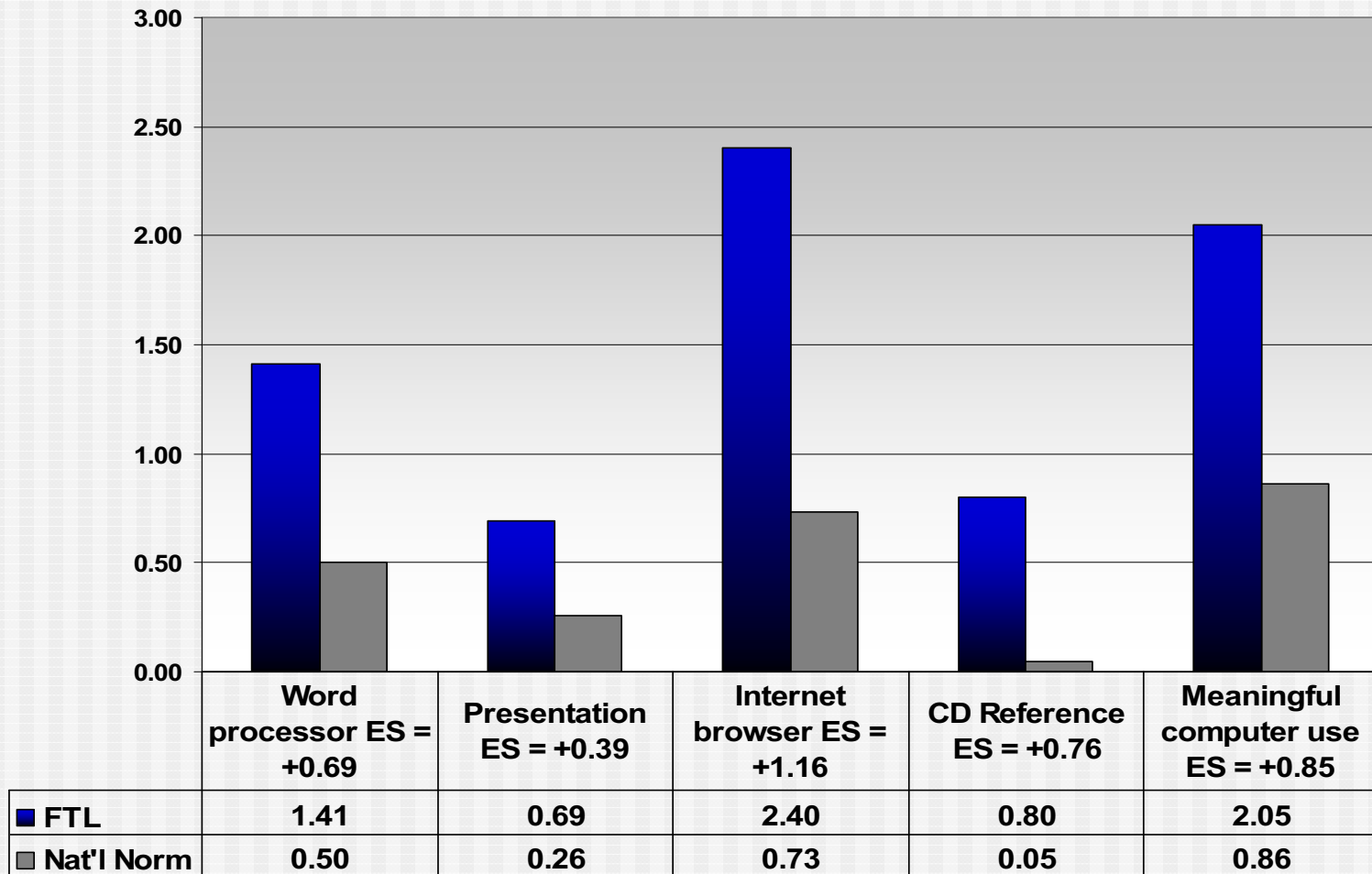
Significant FTL Vs. National Norm Differences



Scale: 0 = Not Observed; 4 = Extensively Observed

Target SCU Results

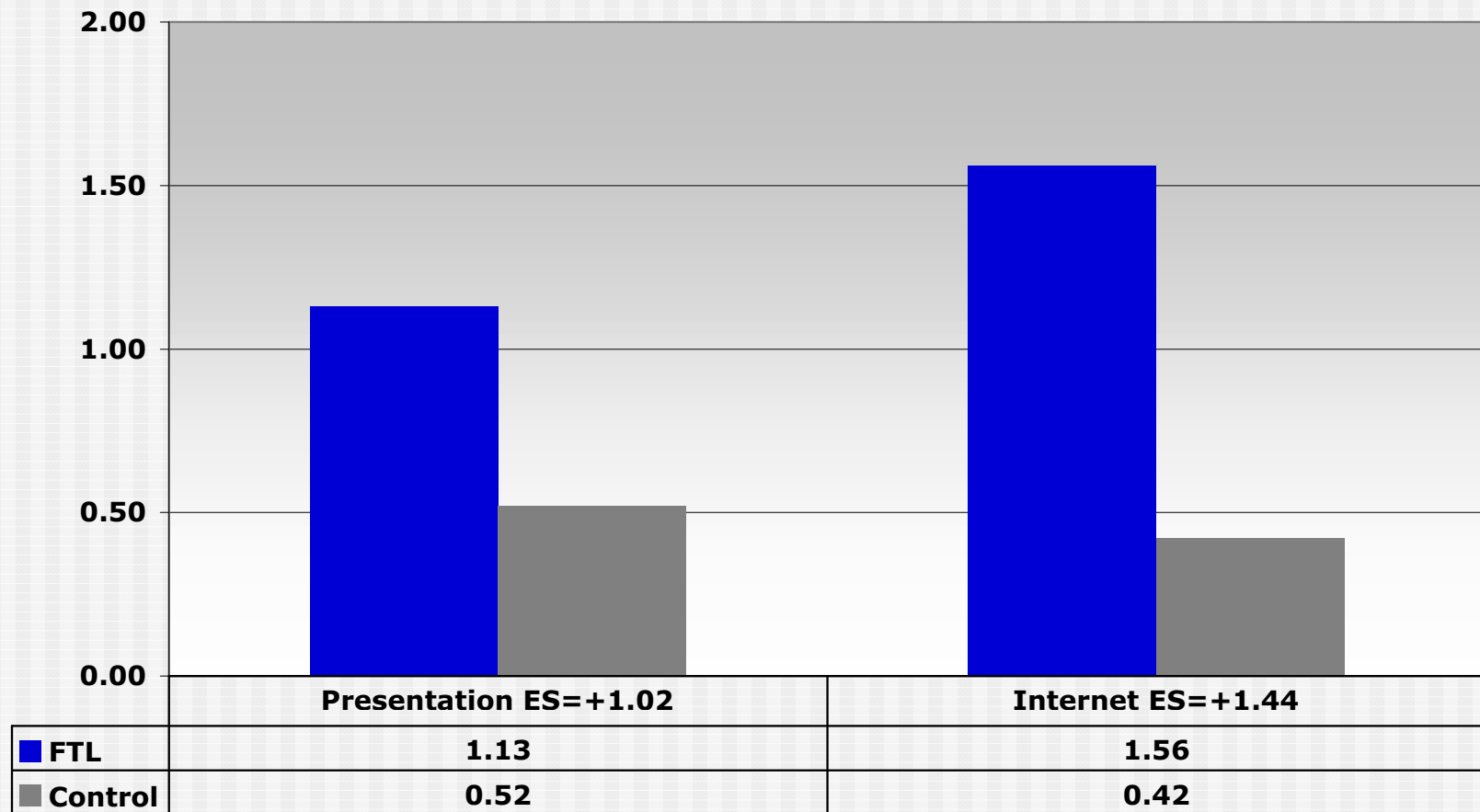
Significant FTL Vs. National Norm Differences



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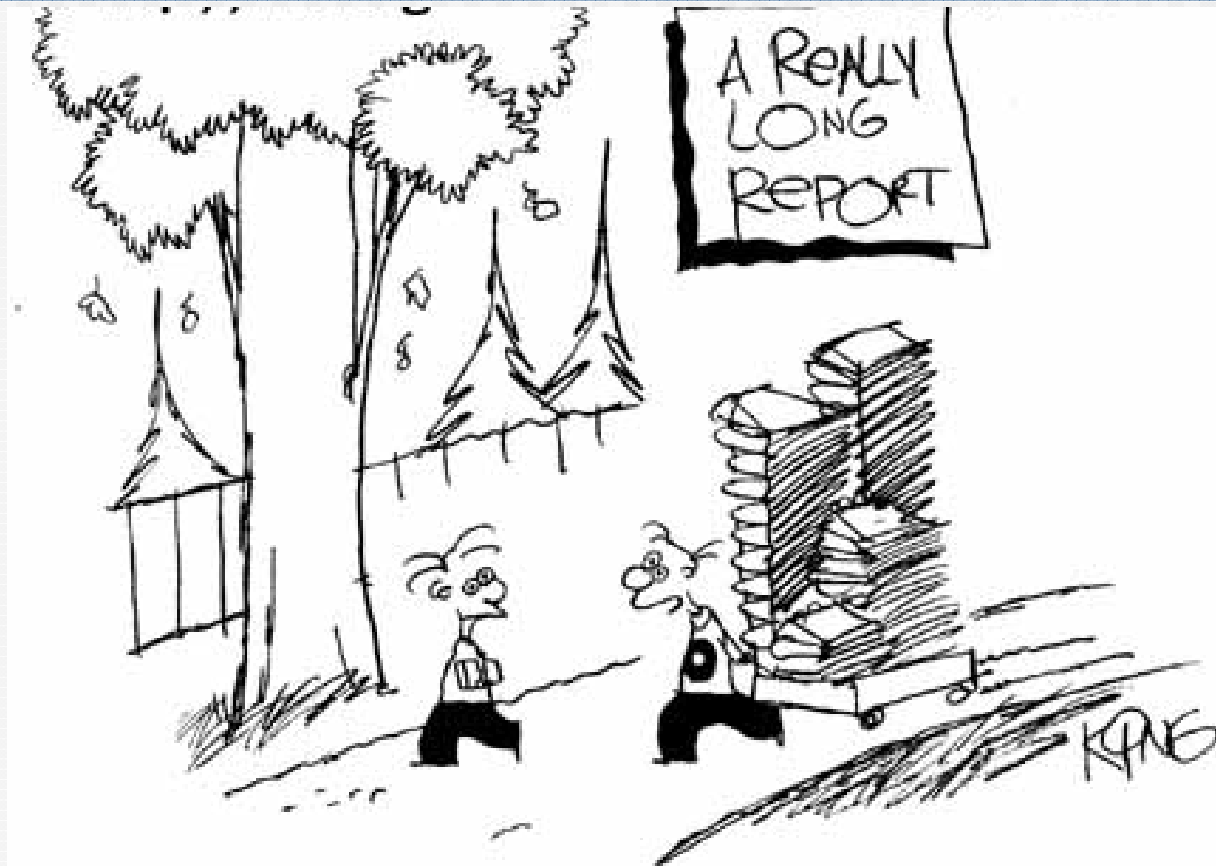
Technology Skills Results

Technology Tasks: Significant FTL vs. Control Differences



Scale: 1= Did not complete task; 2 = Completed Task as Described

A Really Long Report



"This Internet is great for research. I think my report on California breaks a Guinness World Record. 174.513 separate sources!"

Conclusions & Recommendations

- **Successful Technology Integration minimally requires:**
 - **Institutional Support (Positive School Climate)**
 - **Adequate Resources**
 - **Teacher Knowledge/Skills/Attitudes**

Conclusions & Recommendations

- **Strategies to Overcome Barriers**
 - **School must develop a shared vision**
 - **School needs a technology integration plan**
 - **Maintenance of resources**
 - **Equity of access**
 - **Professional development**
 - **Support/encouragement**
 - **Expectations for technology use**

Conclusions & Recommendations

■ Strategies to Overcome Barriers

■ School needs resources

- Classrooms not labs
- Carts with wireless laptop computers
- Rotate students in groups
- Train students to be “Techies”

Conclusions & Recommendations

- **Strategies to Overcome Barriers**
 - **Increase school leader knowledge and support**
 - **Develop clear rules for usage of technology**
 - **Develop reasonable goals and strategies for assessment**

Conclusions & Recommendations

- **Strategies to Overcome Barriers**
 - **Technology can help prepare students for accountability exams (e.g., tutorial programs, ILS)**
 - **Alternative assessments of problem-solving and higher-order learning are also needed.**

Conclusions & Recommendations

- **What can be expected from true technology integration?**
 - **More active (constructivist) student learning**
 - **Teachers as coaches rather than presenters of knowledge**
 - **Higher-order learning and problem-solving**
 - **Students who are prepared for higher education and careers in the 21st Century.**

Thank You

Steven M. Ross

smross@memphis.edu

Deborah L. Lowther

dlowther@memphis.edu